



CONTENTS

NEWS/COMMENTS/PROJECTS 5&6.....	24
INDEX → VOLUME 3 BY R.TIETJENS.....	26
"MORE ART" BY S.KENDALL.....(AB/BB)....	28
"CHRISTMAS CARD" BY E.GROEBE.....(AB/BB)....	29
TUTORIAL - BEGINNER.....	30
TUTORIAL - INTERMEDIATE.....	32
"ATTACK" BY K.DOERGE.....(AB/BB) ...	34
TUTORIAL - ADVANCED.....	37
GAME PLAYER ~ L&M / WAVEMAKER.....	38
"O-JELLO" BY C.PERKINS.....(EB).....	40
BIT FIDDLERS CORNER.....	42
PRINTING WITH ASTROBASIC.....	43
ADS	44

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STATEMENT The purpose of the ARCADIAN is to disseminate information. In order for it to get out, it has to come in. Textual material is now starting to flow - you can see the number of pages used for tutorial, etc., material in these two issues of Vol. 5. But the program submissions have fallen behind. We need programs of all types. There are no magic 'program-maker-uppers' around here, everything comes from the subscribers. Now that we are providing you with some understanding of what is going on - and what could take place with the Basic, we'd expect more program submissions. And we need such submissions to round out the ARCADIAN.

TROUBLESHOOTERS

In the last issue, we asked for some help in the line of persons to review tapes of programs which subscribers submit, programs that have problems of one sort or another. We have received three responses, as follows:

Phil Potter, 704 NW Avenue, Union, IA 52175

Ken Lill, 6608 South Campbell, Chicago, IL 60629

Mark Carlson, P.O. Box 2205, La Habra, CA 90631-1405

The procedure is as follows: If you are having difficulty with a program, make a tape of it and send it to one of the above. Also drop me a note that you did so. The Troubleshooter will review the tape and try to figure out what is wrong, and notify the subscriber. If the problem is interesting enough, he will write a short article for publication.

USER GROUPS

THE LA area users group meeting will be held at the Los Angeles Convention Center (Anaheim) at Booth 322. This will be at the Personal Electronics and Computer Expo on Dec 10 - 12. Discount tickets will be available from Mark Krivulka (213) 443-4189.

Bob Wood of Toronto, Canada, reports that his telephone number is 416-755-0161.

Niagara Falls area subscribers are invited to call K. O'Neill at 689-4595 after 3pm weeknights to learn about the Niagara-Regional BUG.

Both Dick Houser and I are planning to attend the LA meeting on December 11, Saturday. We will be bringing some hardware and software for a "Show and Tell".

SCOREKEEPER There has been some interest shown for a tabulation of high scores on the various Astrocade games. If you are interested in such a tabulation, contact Don Simpson, Box 229, Somers, NY 10589. He will keep track of the scores and let me know the latest "best" in time for a subsequent issue.

NEW SHOP in the South San Francisco Bay area is The Video Adventure, located at 910 Town & Country Village, San Jose. They plan to handle all the programmable video games, and will feature the Astrocade Arcade.

PROJECTS

In the middle of our second year, we were involved with some budding schemes to increase the usability of the Arcade unit, and called these "PROJECTS". Only one of the four became 'real', the Blue Ram memory addition. One other sounded promising - to interface with the TRS80 - but lack of real interest caused that one to wither, and the work done has been destroyed. We are now publicizing two new ideas, Projects 5 and 6.

PROJECT 5: An Extended Color Graphics Processor Board.

This would be a printed circuit board containing a TMS9918A Video Display Processor and 16K dynamic RAM (the memory space will be outside the Arcade's address space). It would be compatible with existing memory additions but does not require them. The board would provide 256x192 pixels. The output would be NTSC composite video, for compatibility with outboard tv devices. There would be four display modes available:-

1. Multi-color lo-resolution:: 48 rows x 64 columns of 4x4 pixel blocks, each in any of the available 16 colors

2. Graphics I:: 24 rows x 32 columns of 8x8 pixel character blocks. 256 characters may be user-defined in two colors each (all 16 colors available in the display simultaneously)

2. Graphics II:: similar to Graphics I, but allows 768 different patterns to be defined, each using up to 16 colors; and 32 "sprites" are available, each in one of the 16 colors. Each "sprite" is either an 8x8 or 16x16 pixel block and is moved without the erase-and-redraw procedures needed in the Astrocade.

3. Text Mode:: 24 lines x 40 columns, similar to the Apple II and Atari 400/800 text modes. Each character is defined as a 6x8 pixel block, allowing standard 5x7 characters with normal spacing. Software will be supplied in both 300 and 2000 baud format to display the full ASCII character set, both upper and lower case; up to 256 characters can be defined by the user in each alternate set.

The normal Astrocade display may be shown as a background to the UDP, or hidden with a solid color "backdrop".

If you are interested in this idea, whose price is targeted at \$300, assembled, tested, and with power supply, please let me know. We may also provide the p.c. board as a separate item, so let me know if you are interested there also.

PROJECT 6:: This will be the small package necessary to get suitable signals out of the Arcade unit to operate a serial printer. In essence, we will take the technology of the old Bally Cassette Interface package and retain only those parts needed for the printer function. We are targeting a cost of \$20 for this unit.

RECORDER IDEAS

Some further words on techniques, etc., of recording programs... Dave Vardin writes that his combination of a Panasonic RQ209DAS plus Certcon 90 tape has given him good service, with only dirty heads and capstan as problems.

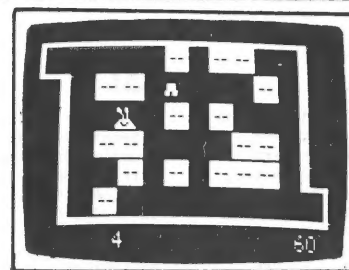
NEW

INTRODUCING

beep!



BEEP



Beep lives in the land of Boggin where he likes to travel from Hither to Yon. It's not an easy journey. He has to contend with the sluggish Blobs and the pesky Kibosh Kids, Skooter and his speedy little sister, Skeeter. Beep must use his beeper to keep the Blobs out of his way and into the path of the Kids who are trying to tag him. Beep! is a new maze chase game which lets you continually change the maze to your advantage during the game. One player. Astro BASIC only.



blob



skooter



skeeter



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The Blue Ram by Perkins Engineering has already opened the door to hundreds of creative programmers who love the powerful graphics and sound capabilities in the Astrocade, but were stymied by its lack of random access memory (RAM). No more! Now, instantly, you can have up to 32768 bytes of additional memory.

You can use the Blue Ram to copy a game cartridge on regular cassette tape using the machine language routines included in the Blue Ram Utility program. Learn Z-80 machine code and modify an existing game cartridge! Write your own cartridge! And, with the 24 pin socket on the Blue Ram you can adapt your computer to drive a modem, a printer, a keyboard and many other applications! Regular price is \$249.95. (32K model is \$369.95).

Blue Ram Extended Basic Cartridge

Written by Jay Fenton and John Perkins to take advantage of the Blue Ram's exclusive input and output ports, hardware and software switching mechanisms, and the Astrocade's outstanding game and graphics design capabilities. With 16K Blue Ram it gives up to 15,500 bytes of programming space (total SZ. With 32K Blue Ram total SZ is 31,884), with special POINT, CIRCLE and SNAP commands, 4 colors, built-in math routines, keyboard and printer-driving logic, 300 baud or 2000 baud data output and much more! Will not operate without a Blue Ram or other extended memory. Regular price is \$49.95.

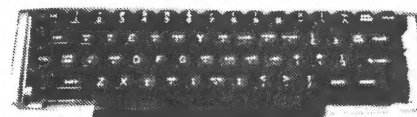


SPECIAL OFFER!

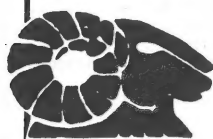
**New 16K Blue Ram and the
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a \$300.00 value**

\$275

New 32K Blue Ram & Extended Basic Cartridge, \$395



The Blue Ram Keyboard! A 62 key typewriter style assembly mounted on wooden end blocks and fitted with a 3 foot cable to plug into the Blue Ram ZIF socket. Bally's command words are added to the keys. Price assembled and tested is \$89.95



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300 baud Bally Basic or 2000 baud Astrocade Basic

ARCADIAN

INDEX TO VOLUME 3 of the ARCADIAN (Nov 80 - Oct 81)

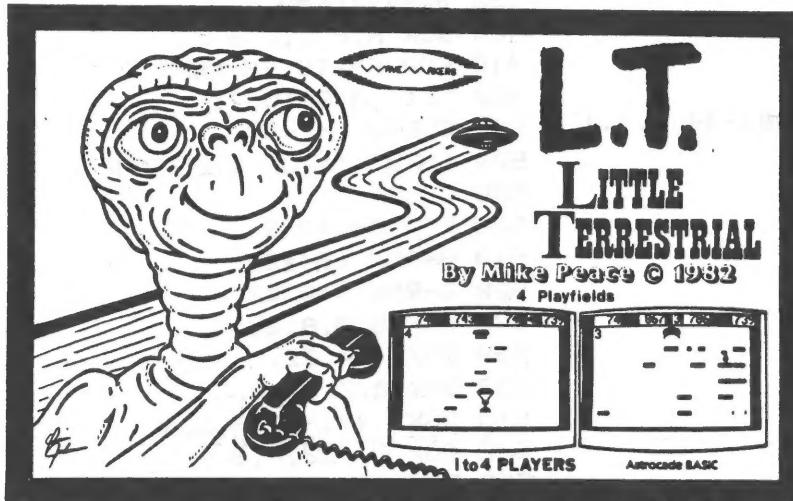
TYPE	TITLE	PAGE
Advertising	(assorted)	.60
Announcement	Alternative Engineering	.51
Announcement	Arcadian Programs on Tape	.127
Announcement	Astrovision Takeover	.1
Announcement	Blue RAM; BSR X-10 Control	.6
Announcement	Cartridge News	.59
Announcement	CES	.31
Announcement	Contest for Programs	.59
Announcement	DATAMAX UV-1	.13
Announcement	Dearborn User Group	.56
Announcement	Personnel Changes	.91
Announcement	Printed Material	.11
Announcement	Short Personal Note	.1
Announcement	Telephone Numbers	.51
Announcement	VIPER memory addition	.56
Announcement	West Coast Computer Faire	.51
Announcement	West Coast Computer Faire	.62
Apology	Sackcloth and Ashes	.111
Application Program	Analog Clock	.105
Application Program	Compound Interest	.99
Applications Program	Grandfather Clock	.34
Contest Note	Contest Entrants	.100
Contest Note	Contest Entrants	.117
Contest Note	Contest Entrants	.121
Contest Note	Contest Thoughts	.101
Correction	Additional BASIC Features	.17
Correction	Alchemisymmetrical	.63
Correction	Blue RAM Keyboard Option	.3
Correction	Golf	.51
Correction	Grandfather Clock	.51
Correction	Musical Staff	.51
Correction	Title/Instruction Program	.31
Corrections	Kludge Board	.94
Demo Program	BASIC-user	.13
Demo Program	Boo	.126
Educational Program	Speed O Math	.6
Educational Program	Telling Time	.114
Game Program	Bally Black Box	.104
Game Program	Bally 500	.57
Game Program	Computer TWIXT	.68
Game Program	Daredevil	.106
Game Program	Defuse	.58
Game Program	Digital Couch	.52
Game Program	Gobblers	.125
Game Program	Golf	.46
Game Program	Horse Race	.7
Game Program	Horse Race	.26
Game Program	Invisible War	.112
Game Program	Keno II 2.0	.116
Game Program	Mastermind	.19
Game Program	Match	.122
Game Program	New Sub Search	.102
Game Program	NIM	.86
Game Program	Old Bent Nose	.96
Game Program	Pool	.95
Game Program	Rebound	.124
Game Program	Spinning Wheel	.92
Game Program	Strategic Air Command	.76
Game Program	Sub Hunter	.75
Game Program	The Pits	.108
Game Program	Tower of Hanoi	.54
General Note	\$100 ARCADIAN Programming Contest	.71
General Note	Ads	.4
General Note	An Expanded Issue	.30
General Note	ARCADIAN Program Reward	.67
General Note	Blue RAM Tutorials	.2
General Note	BYTE Magazine	.13
General Note	Delays	.81
General Note	Edge Tags	.91
General Note	Excellent Tutorial (Machine Lang.)	.42
General Note	Format	.1
General Note	Fred Cornett	.130
General Note	Game Enhancements	.11
General Note	Graphics	.81
General Note	Hyperactive?	.61
General Note	Listed Programs	.41
General Note	Next Issue	.10
General Note	Philosophy	.29
General Note	Popular Computer Descriptions	.31
General Note	Preparation	.51
General Note	Program Enhancements	.12
General Note	Program Reviews	.12
General Note	Programming Contest	.63
General Note	Review Form	.27
General Note	Reviews of Other Computers	.13
General Note	Satisfaction	.121
General Note	Software is the Game	.63
General Note	Telephone Gytrations	.111
General Note	UV-1 Computer	.88
Graphics Program	Alchemisymmetrical	.39
Graphics Program	Boxes	.49
Graphics Program	Circle Plotter	.33
Graphics Program	Circles	.77
Graphics Program	Diamonds	.93
Graphics Program	Electronic Blanked	.49
Graphics Program	Straight Lines	.73
Graphics Program	Symmetrical Art	.113
Graphics Program	Wavemakers Memory Doodle	.67
Graphics Program	3D Corners	.49
Historical Note	Memory	.59
Information Request	Screen Position	.31
Information Request	User Group Reports	.1
Instructions	Bally Black Box	.103
Instructions	Bally Black Box	.118
Instructions	Bally 500	.56
Instructions	Boo	.127
Instructions	Computer TWIXT	.67
Instructions	Digital Couch	.51
Instructions	Pool	.94
Instructions	Spinning Wheel	.91
Instructions	Sub Hunt	.74
Instructions	Tower of Hanoi	.53
Math Program	Denominator	.49
Modification	Daredevil; How to add Sound Effects	.111
Modification	Defuse	.88
Modification	Serendipity	.111
Music Program	Musical Staff	.48
Program Review	Checkbook	.5
Program Review	Graphics Demo	.5
Program Review	Program Tape #1	.38
Program Review	Program Tape #2	.28
Program Review	Tic-Tac-Tollah	.5
Program Review	Video Rally	.5
Publisher's Note	More for Your Money	.101
Publisher's Note	Program Policy	.67
Publisher's Note	Retrospection	.121
Publisher's Note	Zip Code Addition	.111
Publishers Note	What to Print	.81
Sound Program	Music for Games	.97
Sound Program	Surf Sounds/Crickets	.33
Sound Program	Unusual Sounds	.79
Statement	History Statement	.1
Statement	Purpose	.1
Subscription Notice		.111
Subscription Notice		.121
System Note	Apple to BALLY Interface	.53
System Note	Astro BASIC; Latest News	.71
System Note	Astro BASIC; Memory Map	.78
System Note	Astrovision Add-on	.41
System Note	Astrovision BASIC	.101
System Note	BALCHECK	.88
System Note	BALCHECK; BALLYCHECK	.91
System Note	BALCHECK	.11
System Note	Blue RAM BASIC	.127
System Note	Blue RAM Enhancements	.31
System Note	Blue RAM News	.17
System Note	Blue RAM Operating System	.42
System Note	Blue RAM; Communications Interface	.37
System Note	Blue RAM; Enhancements	.117
System Note	Blue RAM; Extended BASIC	.127
System Note	Blue RAM; More BASIC	.36
System Note	Byte-Saving Hint	.31
System Note	Comments (NT=0)	.53
System Note	Controller Problems	.11
System Note	Extended BASIC	.42
System Note	Extended BASIC	.62
System Note	Extended BASIC	.79
System Note	Extended BASIC	.81
System Note	File Search	.4
System Note	Interactive Computer Operation	.31
System Note	Krazy Koppen's Heat Sink	.85
System Note	Memory Expansion Comparisons	.101
System Note	Motherboard Modifications	.72
System Note	New BASIC Languages	.40
System Note	New Game Videocades	.41
System Note	New Videocode Schedule	.121
System Note	New Videocades; Status	.91
System Note	On/Off Switch	.11
System Note	Onboard Calculator (\$)	.98
System Note	Perkins HIRES Board	.63
System Note	Perkins HIRES Board	.94
System Note	Review of Products by Astrovision	.61
System Note	RF Modulator	.11
System Note	RS232 I/O	.53
System Note	The SOURCE	.30
System Note	Video Modulator	.88
System Note	Viper System	.101

ARCADIAN

INDEX TO VOLUME 3 of the ARCADIAN (Nov 80 - Oct 81)

System Note	Viper System	.69
System Note	Viper System; Alternative Engr.	.42
System Note	Viper System; delay	.74
System Note	Viper System; Memory Expansion	.39
System Note	Viper System; 16K RAM Card	.63
System Note	Z-Grass 32; Speech Synthesis	.101
System Note	Z-Grass 32; Vocalize?	.91
System Note	Z-Grass 32; Where's the Add-Under	.127
Tutorial	Blue RAM Programming	.14
Tutorial	How To Keep It Small	.43
Tutorial	Making It Run Faster	.45
Tutorial	Multi-Processing Systems	.4
Tutorial	Pixels	.82
Tutorial	Program Title & Instructions	.20
Tutorial	Special Graphics	.83
Tutorial	Taping Memory	.24
Tutorial	The Source	.32

Tutorial	Tricks of the Trade	.55
User Group Note	CACHE Group (Illinois)	.41
User Group Note	Central & Upper Midwest	.66
User Group Note	Chicago Area	.40
User Group Note	Club News (Chicago Area)	.11
User Group Note	User Group (New Jersey)	.12
User Group Note	Washington, D.C.	.50
User Group Note	Westchester, NY	.50
User Group Report	Blue RAM Program	.18
User Group Report	CACHE Group	.66
User Group Report	Michigan BALLY Users	.64
User Group Report	Michigan User Group Report	.2
Utility Program	Color Chart	.35
Utility Program	Day-of-Week & Calendar	.22
Utility Program	Graphic Character Maker	.84
Utility Program	Graphic Character Maker	.128
Utility Program	Hex Poker	.78



L.T.

Poor Little Terrestrial he just wants to go home but there are so many obstacles in his way. Can you help get him up the "STEPS", through the "PITS" the "ZAPPING GAPS" and the "STEPPING STONES"? Before the time runs out? Play L.T. and help him get home. FOUR PLAY FIELDS, ONE TO FOUR PLAYERS. MACHINE GRAPHICS. ASTRO-BASIC ONLY. SEND \$11.45 TO: WAVEMAKERS, BOX 94801, SCHAUMBURG, IL. 60193

SUPER SOFTWARE
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PLAINFIELD, NJ 07061-0702

PRESENTS:
Tape 14

ZAPPER

By Robert Rosenhouse

You won't be able to resist the tempesting challenge: advancing alien Stompers appear on the horizon to (appropriately enough) stomp you out of existence. Travelling down distinct pathways, these Stompers will eventually come within stomping distance of you. They become more difficult to zap at this level, for they are able to transport themselves unpredictably.

This program features superior sound effects and three-dimensional graphics, a first in Astro BASIC.

Help stomp out Stompers: \$12.00

** Available only in **
** Astro BASIC **

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WINTER 1982
ASTROCADE
SOURCEBOOK?

The SOURCEBOOK is a compilation of known SOURCES of Hardware and Software Products for the BALLY/ASTROCADE Professional ARCADE. It contains the only available complete index and descriptions to the ARCADIAN programs and tutorials. The SOURCEBOOK also has a 48 page catalog section containing complete coverage of the top sixteen Software and Hardware Sources.

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Regular price is \$8.00

ARCADIAN

```

11 T=0;NT=3
12 FC=112;BC=134
13 FOR W=1 TO 5
14 PRINT ;PRINT
16 NEXT W
18 PRINT "      M O R E   A R T"
20 PRINT "      P R O G . G - I I I"
22 FOR A=-80 TO 80
26 T=T+RND (6)-3
30 IF T>50 T=40
34 LINE A,-44,0
36 MU=T
38 LINE A,T-44,3
40 NEXT A
48 . #2 BOX PATTERNS
50 FOR B=1 TO 60
51 FC=51
52 BOX RND (160)-80,RND (88)-44,1,1,1
54 MU=B
56 NEXT B
58 BC=70;FC=81
60 BOX -60,20,8,8,3
62 BOX -48,20,8,1,3
64 BOX -72, 20,8,1,3
66 BOX -60,36,2,16,3
68 BOX -60,4,2,16,3
70 FOR Z=1 TO 1000;NEXT Z
71 CLEAR ;BC=143;FC=112
72 NT=0;LIST 76,4
76 . #1 RND BOX
78 . #2 BOX PATTERNS
80 . #3 WIERD BOX
82 . #4 BOX 'S
84 PRINT
86 PRINT "PRESS GAME #"
87 PRINT "  PRESS 'S '"
88 IF KP=49 GOTO 100
90 IF KP=50 GOTO 900
92 IF KP=51 GOTO 300
94 IF KP=52 GOTO 500
100 CLEAR ;NT=3
110 FOR Y=1 TO 30
112 FC=RND (32)*8+4
114 BC=FC+4
120 B=RND (12)*10
130 C=RND (8)*10
132 MU=FC
140 BOX 0,0,B,C,3
142 BOX 0,0,C,B,3
150 FOR X=1 TO 10
160 D=RND (24)*2
170 BOX -60,22,D,D,3
172 BOX -60,-22,D,D,3
180 BOX 60,22,D,D,3
182 BOX 60,-22,D,D,3
190 NEXT X
200 NEXT Y

```

```

210 GOTO 920
300 CLEAR ;NT=3;FC=8
310 FOR N=1 TO 30
320 MU=RND (30)+30
330 BC=151;FC=153
340 BOX 0,0,88,88,3
350 A=RND (40)-20
360 B=RND (40)-20
370 C=RND (60)
380 BOX A,A,60,60,3
390 BOX B,B,60,60,3
392 BC=15;FC=9
400 BOX A,A,C,C,3
410 FOR P=1 TO 50;NEXT P
420 NEXT N;GOTO 71
500 CLEAR ;NT=3
504 INPUT "# OF CYCLES"R
506 CLEAR
508 FOR Q=1 TO R
510 A=RND (8)*20
520 B=RND (40)*2
522 BOX 0,0,A,B,3
530 BOX -44,22,A,B,3
532 BOX 0,22,A,B,3
540 BOX -44,-22,A,B,3
542 BOX 0,-22,A,B,3
550 BOX 44,-22,A,B,3
552 BOX 44,22,A,B,3
560 FC=RND (32)*8+4
570 BC=FC+4
580 MU=A
590 NEXT Q
600 GOTO 71
900 .BOX PATTERNS 4/81
910 CLEAR ;NT=3
920 FOR I=1 TO 10
930 FC=RND (32)*8+4
940 MU=RND (80)
950 A=RND (40)*2
960 BOX 0,0,A,A,3
970 FOR J=1 TO 10
980 B=RND (30)*2
990 FOR K=1 TO 50
1000 NEXT K
1002 BOX -20,-20,B,B,3
1010 BOX 20,20,B,B,3
1012 BOX -20,20,B,B,3
1016 BOX 20,-20,B,B,3
1020 FC=RND (32)*8+4
1030 NEXT J
1040 NEXT I
1050 GOTO 71

```

A graphics demo of
small boxes on the
screen. Note the
Menu scheme.

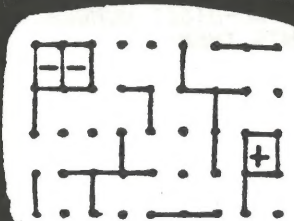
S.KENDALL
1945 WASHINGTON AVE
WILLMETTE,IL

```

1.
2. XMAS TREE
3. ED GROEBE
5 CLEAR ;NT=0
10 A=20200
12 S=17684
20 &(0)=7
21 &(1)=7
22 &(2)=126
23 &(3)=179
24 &(9)=0
27 FOR V=1 TO 5
28 S=S+V*80
30 FOR Y=STO S+2000*VSTEP 40
40 Z=(Y-S)/40
60 FOR W=-(3*XZ)/4 TO (3*XZ)/4
65 R=RND (16)
66 IF R<3GOSUB 400
67 IF R=3GOSUB 500
68 IF R>3GOSUB 600
70 GOSUB 200
80 NEXT W
90 NEXT Y
100 NEXT V
110 CY=16
112 PRINT " MERRY CHRISTMAS 1982
113 BOX 2,10,3,4,1
120 FOR K=1 TO 200
130 &(2)=7
140 &(2)=129
150 NEXT K
190 IF KPGOTO 5
200 &(A)=-43
210 &(A+2)=299
220 &(A+4)=X
230 &(A+6)=Y+W-B
240 &(A+8)=-13871
250 CALL A;RETURN
400 X=-5374;B=40;RETURN
500 X=-10494;B=40;RETURN
600 X=-255;B=0;RETURN

```

—EDGE— SOFTWARE



1. DOTS

```

1 2 3 4 - - - -
4 2 1 3 + - - -
4 1 2 3 + + - -
1 2 4 3 + + - -
2 1 4 3 + + + +

```

2. MASTERMIND

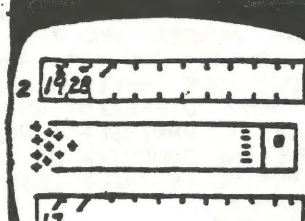
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29

—EDGE— SOFTWARE



1. BOWL

```

A B C D E
F H I J
K L M N O
4 Q R T

```

2. MATCH

TAPE # 1 \$12.95

EDGE
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PALOS HTS, ILLINOIS 60463

ARCADIAN

WHAT IS A VARIABLE?

DON GLADDEN

WHEN WE ARE WORKING WITH COMPUTERS, WE ARE ALWAYS WORKING WITH NUMBERS. IN FACT, ALL THAT COMPUTERS UNDERSTAND ARE NUMBERS. EVEN WHEN WE USE LETTERS, WORDS, AND CHARACTERS, THE COMPUTER ONLY UNDERSTANDS THE NUMBERS THAT STAND FOR THEM. SO BRINGS ABOUT THE VERY HANDY PROGRAMMING TOOL CALLED THE "VARIABLE".

WHAT IS A VARIABLE? IT IS A LETTER OR COMBINATION OF TWO LETTERS THAT WE CAN USE TO STORE A VALUE OR NUMBER IN. A GOOD WAY TO ILLUSTRATE THIS IS TO THINK OF A ROW OF MAILBOXES. EACH BOX EITHER CONTAINS SOMETHING, (IN OUR CASE A VALUE), OR IS EMPTY. (A ZERO.) WE CAN USE THE LETTERS A THROUGH Z AS 26 "MAILBOXES" TO STORE VALUES IN AS WE DESIRE. TO DO THIS, WE SIMPLY TELL THE COMPUTER THE VARIABLE THAT WE WANT TO USE IS EQUAL TO THE VALUE THAT WE WANT STORED IN IT. LETS SAY THAT WE WANT "A" TO CONTAIN 50, "B" TO CONTAIN 25, AND "C" TO CONTAIN -10. SIMPLY KEY IN: A=50;B=25;C=-10 AND HIT "GO". YOU'VE DONE IT! TO PROVE THAT THESE VALUES ARE NOW STORED, KEY IN: PRINT A;PRINT B;PRINT C AND "GO", AND THERE ARE YOUR VALUES. AGAIN, AS WE DISCUSSED IN OUR LAST LESSON, WE CAN SET THESE VARIABLES INSIDE OUR PROGRAM, (INSIDE A LINE NUMBER), OR OUTSIDE OF IT USING A DIRECT COMMAND SUCH AS WE JUST DID. TRY THIS:::

```
>10 CLEAR
>20 A=50
>30 B=100
>40 C=-10
>50 PRINT A,B,C
AN EASIER WAY TO SET YOUR VARIABLES INSIDE A PROGRAM IS TO USE THE "INPUT" COMMAND. WHEN THE COMPUTER SEES AN "INPUT", IT STOPS AND WAITS FOR YOU TO INPUT A NUMBER OR VALUE, AND THEN PROCEEDS. CHANGE THE PROGRAM AS FOLLOWS:
```

```
>10 CLEAR
>20 INPUT A
>30 INPUT B
>40 INPUT C
>50 PRINT A,B,C
NOW "RUN" THE PROGRAM. YOU WILL SEE AN "A" PRINTED ON THE SCREEN. THE COMPUTER IS NOW WAITING FOR YOU TO INPUT A VALUE FOR THE VARIABLE "A". ENTER ANY NUMBER, AND PRESS "GO". THEN ENTER NUMBERS FOR "B" AND "C", AND THE COMPUTER WILL PRINT OUT YOUR THREE VALUES IMMEDIATELY. THERE ARE MANY DIFFERENT WAYS THAT WE CAN ASSIGN VALUES TO VARIABLES, AND ALSO WAYS THAT WE CAN HAVE THE COMPUTER DO IT FOR US, AS WE WILL BE LEARNING IN THESE LESSONS. TRY THESE SHORT PROGRAMS:
```

```
>10 INPUT A      >10 A=0
>20 INPUT B      >20 A=A+1
>30 C=A+B        >30 PRINT A
>40 PRINT #1,A,"+",B, >40 IF A=10STOP
"=",C           >50 GOTO 20
>50 RUN
```

PRINTING OF NUMBERS *****AND VARIABLES*****

LAST MONTH WE LEARNED HOW TO PRINT TEXT ON THE SCREEN IN ANY LOCATION THAT WE WANTED USING "CX" AND "CY" TO SET OUR STARTING PRINT LOCATIONS. NUMBERS AND VARIABLES ARE HANDLED SOMEWHAT DIFFERENTLY, AS WE WILL NOW SEE.

WHEN WE PRINT A NUMBER, WE DO NOT USE QUOTATION MARKS. KEY IN: PRINT 100 AND "GO". THE COMPUTER RESPONDS BY PRINTING THE NUMBER TABBED OVER TO THE RIGHT OF THE CX VALUE. YOU CAN ALSO HAVE YOUR COMPUTER DO MATH IN THIS WAY.

```
PRINT 100+100 (GO)
```

```
200
```

```
PRINT 50*10    "
```

```
500
```

```
PRINT 75÷25    "
```

```
3
```

OR: USE VARIABLES.

```
A=50;PRINT A
```

```
50
```

```
B=10;PRINT B
```

```
10
```

```
PRINT A+B
```

```
60
```

ONE MORE TIME: IF WE ARE USING QUOTATION MARKS AFTER OUR "PRINT" STATEMENT, THE COMPUTER WILL PRINT EXACTLY WHAT IS INSIDE THE QUOTATION MARKS. IF WE DON'T, WE MUST FOLLOW THE "PRINT" STATEMENT WITH: 1-A NUMBER, 2-A MATHEMATICAL PROBLEM (PRINT 2+2, ETC.) OR, 3-A VARIABLE. (WHICH THE COMPUTER UNDERSTANDS AS A VALUE.). THE VARIABLES THAT WE ARE CONCERNED WITH IN THIS LESSON HAVE BEEN "ONE-LETTER" VARIABLES, A THROUGH Z. "TWO-LETTER" VARIABLES, SUCH AS "CX" AND "CY", AND OTHER VARIABLES WILL BE COVERED IN A FUTURE ARTICLE.

THE AUTOMATIC "TAB" FUNCTION WORKS SOMETHING LIKE THIS: WHEN WE TELL OUR COMPUTER TO "PRINT A", HE WILL TAKE THE LAST DIGIT OF THE NUMBER THAT IS STORED IN "A", AND PRINT IT EIGHT SPACES TO THE RIGHT OF OUR CURRENT "CX" VALUE. TO ILLUSTRATE, USE THIS PROGRAM:

```
>10 CLEAR
>20 INPUT A
>30 PRINT A
>40 GOTO 20
WHEN THE COMPUTER ASKS FOR "A", INPUT FIRST A ONE-DIGIT NUMBER, THEN A TWO-DIGIT NUMBER, ETC., AND NOTICE HOW HE PRINTS THEM.
```

```
A 1 (GO)
1
A 12
12
A 123
123
A 1234
1234
```

EACH TIME, THE FIRST DIGIT IS SHIFTED TO KEEP THE LAST DIGIT IN THE SAME COLUMN. THIS CAN BE VERY HANDY IN BUSINESS-TYPE PROGRAMS THAT NEED VALUES PRINTED IN NICE, NEAT COLUMNS.

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NOW, WHAT IF WE DO NOT WANT OUR VALUE(S) TABBED EIGHT SPACES? SIMPLE. WE JUST TELL OUR COMPUTER HOW MANY SPACES OVER THAT WE WANT THE LAST DIGIT. IF WE HAVE TOO MANY DIGITS IN OUR VALUE, HE WILL AUTOMATICALLY SHIFT EVERYTHING OVER TO THE RIGHT AS MANY SPACES AS NEEDED TO FIT THE WHOLE NUMBER IN. WE DO THIS LIKE SO:

```
>10 CLEAR
>20 INPUT A
>30 PRINT #3,A (3 SPACES INSTEAD OF 8.)
>40 GOTO 20
```

NOW "RUN", AND NOTICE THE DIFFERENCE.

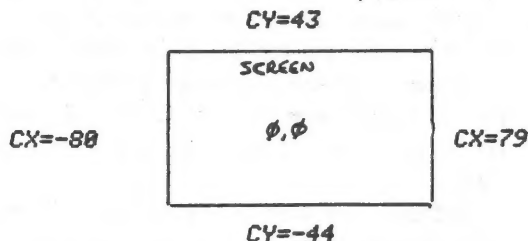
```
A 1
1
A 12
12
A 123
123
A 1234
1234
```

NOTICE WHEN WE ENTERED A FOUR DIGIT VALUE FOR "A", HE SHIFTED TO THE RIGHT TO ALLOW THE WHOLE VALUE (4 DIGITS) TO BE PRINTED. CHANGE THE VALUES AFTER THE "#" IN LINE #30 TO EXPERIMENT.

AN EXAMPLE OF WHERE WE MIGHT USE THIS: LET'S SAY WE ARE WRITING A GAME PROGRAM THAT IS SHOWING A PLAYERS SCORE. WE WOULD BE USING VARIABLES TO KEEP THE SCORES IN, AND ALSO THE PLAYER#. KEY THIS SHORT PROGRAM IN:

```
>10 CLEAR
>20 P=1 (PLAYER NO.)
>30 S=1000 (SCORE)
>40 PRINT "PLAYER=",P," SCORE=",S
IN AN ACTUAL GAME PROGRAM, THE VALUES FOR "P"
AND "S" WOULD BE CONSTANTLY CHANGING, BUT
FOR ILLUSTRATIVE PURPOSES, WE ARE SETTING
THEM IN LINES 20 AND 30. RUN THE PROGRAM.
WE CAN SEE THE "AUTOMATIC TAB" WORKING. EACH
VALUE THE COMPUTER IS PRINTING IS TABBED THE
EIGHT SPACES, WHICH LOOKS KIND OF FUNNY FOR
OUR PURPOSE HERE. SO, SIMPLY CHANGE LINE#40
TO READ:
>40 PRINT #1,"PLAYER=",P," SCORE=",S
NOW RUN THE PROGRAM AND SEE THE DIFFERENCE.
```

THE TAB FUNCTION ONLY WORKS WITH VALUES PRINTED, NEVER WITH TEXT. USE THE CX AND CY TO MOVE YOUR TEXT AND/OR VALUES AROUND THE SCREEN TO PRINT ANYWHERE YOU WISH. REMEMBER, THE CX CAN BE ANYWHERE FROM -80 TO 79, AND CY FROM -44 TO 43, WITH ZERO BEING THE CENTER OF THE SCREEN.



USE THE FOLLOWING PROGRAMS TO GET THE HANG OF PRINTING BOTH TEXT AND VALUES.

```
>10 INPUT X,Y
>20 CLEAR
>30 CX=X;CY=Y
>40 PRINT "HI THERE"
>50 GOTO 10
```

```
>10 CLEAR
>20 INPUT A,B
>30 PRINT #A,B
>40 GOTO 20
```

```
>10 CLEAR
>20 A=0
>30 PRINT #A,10
>40 A=A+1
>50 GOTO 30
```

```
>10 CLEAR
>20 A=-80
>30 CY=0;CX=A
>40 PRINT "HELLO!"
>50 A=A+1
>60 IF A>40GOTO 20
>70 GOTO 30
```

HERE IS A PROGRAM THAT LETS THE COMPUTER DO ALL OF THE WORK FOR YOU:

```
>10 INPUT "CX VALUE?"X
>20 INPUT "CY VALUE?"Y
>30 INPUT "TAB VALUE?"T
>40 INPUT "VALUE?"V
>50 CLEAR
>60 CX=X;CY=Y;PRINT #T,V
```

(WHEN YOU FOLLOW AN "INPUT" COMMAND WITH TEXT, HE WILL PRINT THE TEXT, THEN WAIT FOR INPUT.)

OUR NEXT TUTORIAL WILL DISCUSS RANDOM NUMBERS AND LOOPS. (FOR-TO-STEP-NEXT AND RND)

COMMAND WORDS COVERED SO FAR:

PRINT-TELLS THE COMPUTER TO PRINT TEXT AND/OR VALUES ON THE SCREEN.

GOTO-TELLS HIM WHAT LINE NUMBER TO GO TO IF WE WANT HIM TO CHANGE HIS SEQUENCE OF DOING THINGS.

IF-TELLS HIM IF A STATEMENT IS TRUE TO FINISH DOING WHAT IS ON THAT LINE. IF NOT, GO ON TO THE NEXT LINE.

CLEAR-CLEAR THE SCREEN.

LIST-SHOW US THE WHOLE PROGRAM THAT IS IN MEMORY.

RUN-RUN THE PROGRAM IN MEMORY.

GO-EXECUTE THE COMMAND JUST GIVEN OR ENTER THE LINE JUST KEYED IN INTO THE CURRENT PROGRAM IN MEMORY.

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PLAIN BASIC TALK by Ken Lill

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Article #2: IF's, IF/OR's and TRUE/FALSE Statements and Commands.

An IF statement or command means:

If this command is "true" then do the rest of the statement. If it is NOT true, jump to the next line in the program!

I am grateful to George Moses for his permission to use his program "Astro Zap 2000" for most of my examples in this article! Astro Zap 2000 can be found in the ARCADIAN #4-9 Page# 88, Issued 7-6-82.

Line # 21 has the first example of an IF command. The statement is:

```
>21 etc., ;IF @(F)=0PRINT #1,"00"
```

Let's break this down. It says " If the string location at the number that is currently in memory "F" is 0 then PRINT on the screen "00" where the current CX and CY locations are! When the string @(F) is NOT = 0 then go to the next line (22 in this case) and continue from there!

Lines 26 thru 32 also have IF statements that we will look at:

```
>26 N=N+1;IF N=6GOTO 70
```

```
>27 IF B=6GOSUB 2
```

```
>30 GOSUB 3;ect,;IF E=94B=-40;GOTO 60
```

```
>31 IF E=95B=64;C=-C
```

```
>32 IF E=96B=40;C=-C;GOTO 60
```

Now let's break all of this down! Line # 26 says to add 1 to N. IF the number in N = the number in M then go to Line # 70 and continue on with the program! IF N is NOT = M then jump to the next line (27). Line # 27 says: IF B = V then go to subroutine # 2, return from there, and go to the next line. IF B is NOT = V then DO NOT go to subroutine # 2! Line 30 has an IF at the end and 2 statements follow it. It says: IF E=94B=-40;GOTO 60.

Let's say that E=96. When the program gets to the IF in that line, it sees that E is NOT = 94 so it goes to the next line (31). Once again it checks E and it finds out it is NOT = 95. It goes on to the next line (32). Now when it checks E it finds it equal to the number you're looking for so it executes the rest of the line. It makes B=-40 and then makes C = -C. One thing to remember, 2 "like" signs will always give you a positive number! (2 minuses will

give you a plus!). On the other hand, 2 opposite signs will give you a MINUS, in a statement like C=-C!!!

Line # 500 has the only IF/OR statement in this program. It is at the end of the line and it says: ;IF (G(1)+(G)4)RUN

This works a little different than a regular IF statement. The parentheses, or brackets, around the 2 statements makes them TRUE or FALSE!! What happens is, when the program gets to the (G(1) it checks the number in G. If it IS less than 1 it then sets up a "1" 'flag'. If it is)0 it sets up a "0". Then it checks the other statement (G)4) to see if it is)4. Then it adds the numbers together (1+0=1). If there is ANY number other than 0 for a IF/OR statement, that statement or command will be executed!!

One little trick you can use an IF/OR statement for is checking to see if so many out of so many statements are "true". George Moses didn't use any of these in his program. Here is one example:

```
>3000 IF (A=2)+(B=3)+(C=4)=2 GOTO 100
```

This means that if A=2 and B=3 and C is NOT equal to (3) 4 OR A=2 and C=4 but B#3 OR A#2 and B=3 and C=4 then go to line 100. ONLY these 3 ways will make the program go to 100! If any 2 of these are not "true" or if ALL of these are "true" then the program will go to the next line! This type of line could replace "double", "triple", etc., IF's. Let's change line # 50 in Astro Zap 2000 for example. The "double-IF" is after the statement TV=E;

```
IF (JX(F))+(JY(F)=0)=2XY=0;etc.
```

This statement will work but it has 2 drawbacks. One is it uses more BYTES, 24 for our example, 18 for the "double-IF". And it is slightly slower if JX(F)=0 because it still has to check JY(F) and add the two together before it assumes that the statement is "FALSE". With the "double-IF" when it gets to IF JX(F) and it is false it will jump to the next line right away!

REMEMBER: The more IF statements that are in the main running portion of your program, the slower your program will run because the computer HAS to check EVERY ONE to see whether or not it is "TRUE"!!! So, choose your IF statements very carefully and try to use the

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majority of them to do more than one command, if possible!!

One more example is the TRUE/FALSE (No IF's) statement. Because they don't use an IF, they usually "run" faster. The major drawback is they sometimes use more BYTES. One example of this is to combine lines 98 and 99 and make them line 98. Let's do it this way:

```
>98 GOTO((M)+(N)=0)x125+75
```

This example means to check M, and if any number other than 0 is there, set up a "1" flag. Then do the same for N. If there are NO "1" flags the whole TRUE/FALSE statement is "true", so then there is a "1" flag set up. It then multiplies that by 125. If it is "false" it will multiply 0 x 125 and come up with 0. Then it adds 75 to that number and then it goes to that line! Another way to do the same thing, but use more BYTES is like this:

```
>98 GOTO (M=0)x(N=0)x125+75
```

This works the SAME WAY, except that you are using 2 multiply commands instead of 2 add commands. It uses 2 more BYTES. In BOTH cases, if either M or N have any number in them other than 0, the TRUE/FALSE statement(s) will = 0. Zero x 125 = 0. 0+75 = 75. The computer will then go to line 75. If BOTH M and N are = 0, then the statements are true. 1 x 125 = 125. 125 + 75 = 200. So the computer will go to line 200!!! Our first example uses the same number is that it is on 1 line and it will "run" faster because it doesn't have an IF!!!

One VERY IMPORTANT thing to remember when using an IF inside of a "loop" is that you MUST put your "NEXT n" in a line AFTER the IF statement! If you don't, then the computer will never reach the NEXT. One other thing to be careful about is when you have a "GOTO" inside of a loop, and within the IF, you MUST first "end" the loop. This is done like this:

```
>5000 FOR A=0 TO 9;IF A=5A=9;NEXT A;GOTO 500
```

If you omit "A=9;NEXT A" the computer will still be set up in a loop. If it hits this same point 3 times, your program will BOMB! There is only 1 way around this, if line 500 has a statement in it that says "FOR A=",etc. This will reset the "flag" for the A loop. Please make SURE that the loop will reset, so that it will save you MANY hours of trying to find out exactly what went wrong!!!

I hope this article has helped you understand the types of IF IF/OR and TRUE/FALSE statements so that you can use them more easily and efficiently in your programs. If you have any questions about any of my articles, or any other "tips" I can possibly help you on, please write to the ARCADIAN. They will try to put all of these questions in print, (If possible) and then I will try to have the answer for you within the next 2 issues.

NITRON NEWS

This is the latest word on the Nitron situation - The Artillery Duel and Pirate's Chase Videocades have been appearing in local stores, and more will be on the way.

CUPERTINO, CALIFORNIA, NOVEMBER 2, 1982 . . . NITRON, INC. (NASDAQ:NITR), has reached final agreement for obtaining banking accommodations that permit substantial shipments of Astrocade video-game cartridges and consoles commencing immediately.

Nitron also announced that following discussions an agreement was executed whereby Nitron was confirmed as the technological arm and primary manufacturing source for Astrocade. Subject to approval by Boards of Directors, other unnamed parties will acquire control of Astrocade. The transaction, when finalized, will involve an exchange of shares and will provide additional funds for Astrocade working capital, marketing and other corporate purposes. According to the terms of the executed Agreement, the finalization of all necessary documentation and various approvals, including completion of audit and appropriate arrangements with Astrocade creditors, is expected during November 1982.

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```

2 .ATTACK
3 .
10 CLEAR ;BC=66;FC=6;P=0;Q=10;CX=P;CY=Q;Z=430;GOSUB 540
15 NT=0;CX=-21;CY=10;PRINT " ATTACK
20 CY=-39;PRINT " NUMBER OF WALLS?:
30 U=KN(1)+10+13;CX=28;CY=-39;PRINT U;IF TR(1)=0GOTO 30
40 IF TR(1)=1U=U+6;GOTO 60
50 A=RND (99)
60 @(1)=RND (99);FOR A=2TO U
70 L=RND (99);N=A-1;FOR B=1TO N;NT=3;MU=L+B;NT=0;IF L=@(B)GOTO 70
80 NEXT B
90 @(A)=L;NEXT A
100 P=RND (98)-49;Q=RND (10)-5;CLEAR ;BC=6;FC=9;GOSUB 540;P=P-28;Q=Q-23;FOR A=7
TO U;GOSUB 470;GOSUB 490;NEXT A
110 FOR A=2TO 6;GOSUB 470;GOSUB 510;NEXT A;X=@(1);Y=(X-1)+10;X=X-Y*10;GOSUB 520

120 CX=-36;CY=40;PRINT "> YOUR MOVE <
130 IF TR(1)#0GOTO 155
140 K=JX(1);J=JY(1);IF K=0IF J=0GOTO 130
150 GOSUB 460;BOX H,I,5,5,1;X=X+RND (2)*K;Y=Y+RND (2)*J
155 GOSUB 520;IF X<1GOTO Z
160 IF X>10GOTO Z
170 IF Y<0GOTO Z
180 IF Y>9GOTO Z
190 C=Y*10+X;FOR A=2TO U;IF C=@(A)GOTO Z
200 NEXT A
210 FOR A=2TO 6;L=@(A);IF L<1GOTO 350
220 T=(L-1)+10;S=L-T*10;V=X-S;W=Y-T;FOR B=2TO 6;IF A=BGOTO 240
230 IF L=@(B)GOTO 250
240 NEXT B;GOSUB 480;BOX H,I,5,5,1
250 IF V=0GOTO 290
260 IF V<0S=S-1
270 IF V>0S=S+1
280 IF W=0GOTO 310
290 IF W<0T=T-1
300 IF W>0T=T+1
310 GOSUB 500;D=T*10+S;@(A)=D;IF D=CGOTO 440
320 FOR B=7TO U;IF D#@ (B)GOTO 340
330 @(A)=-1;GOSUB 530;GOTO 350
340 NEXT B
350 NEXT A
360 FOR A=2TO 5;L=@(A);IF L<1GOTO 390
370 FOR B=A+1TO 6;IF L=@(B)@(A)=-1
380 NEXT B
390 NEXT A
400 FOR A=2TO 6;IF @(A)>0GOTO 120
410 NEXT A;FOR A=1TO 5;GOSUB 520;NEXT A
420 BC=202;FC=7;CY=40;PRINT " ALL ATTACKERS DESTROYED!";FOR E=1TO 30;NT=5;MU=70
;NEXT E;RUN
430 BC=1;FC=118;CY=40;PRINT "YOU ZAPPED YOURSELF,TURKEY";GOTO 450
440 FC=98;CY=40;PRINT " YOU ARE  Z A P P E D !!!
450 NT=2;FOR A=1TO 15;MU=44;X=FC;MU=46;FC=BC;MU=48;BC=X;MU=46;NEXT A
452 FOR T=1TO 5;@(17)=31;@(19)=37;@(21)=47;@(22)=31;FOR S=35TO 15STEP -1;@(16)=
S;NEXT S;FOR S=15TO 35;@(16)=S;NEXT S;NEXT T

```

Klaus Doerge
11 westcreek Pl.
Plano TX 75074

This is somewhat like BOTS - you have to keep walls between yourself and the ever-oncoming attackers. Use JX and JY to maneuver, TR if you want to stand fast.



```

454 FOR O=22TO 16STEP -1;&(O)=0;NEXT O;RUN
460 H=P+X*5;I=Q+Y*5;RETURN
470 S=@(A);T=(S-1)*10;S=S-T*10
480 H=P+S*5;I=Q+T*5;RETURN
490 BOX H,I,5,5,2;NT=2;MU=H;MU=I;NT=0;RETURN
500 GOSUB 480
510 BOX H,I,5,1,2;BOX H,I,1,5,2;BOX H,I,3,3,2;NT=2;MU=55;MU=53;MU=51;MU=53;MU=5
5;NT=0;RETURN
520 GOSUB 460;BOX 0,40,160,8,2;BOX H,I,3,3,2;BOX H,I,1,1,1;NT=3;FOR E=1TO 9;MU=
80;NEXT E;NT=0;RETURN
530 BOX H,I,5,5,1;BOX H,I,3,3,3;BOX H,I,5,5,2;BOX H,I,3,3,3;BOX H,I,1,1,3;BOX H
,I,3,3,2;BOX H,I,1,1,3
535 NT=2;FOR E=1TO 15;MU=33;NEXT E;NT=0;BOX H,I,5,5,2;RETURN
540 BOX P,Q,62,62,3;BOX P,Q,60,60,3;BOX P,Q,50,50,3;RETURN

```

DUE TO THE HOLIDAYS LATER THIS MONTH, WE MAY BE DELAYED IN GETTING THE JANUARY ISSUE PRINTED.



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ARCADIAN

CHRDIS II

HOW TO USE HOME MADE GRAPHICS
BY MIKE SKALA

BUILDING YOUR OWN GRAPHICS FOR USE WITH OUR CHRDIS ROUTINE IS A FAIRLY SIMPLE TASK. THE "GRAPHIC CHARACTER MAKER" PUBLISHED IN THE ARCADIAN (VOL.3 PP.82-84) COULD BE MODIFIED READILY IF YOU KNOW WHAT YOU ARE DOING. IF YOU DON'T, THEN READ ON...

THE "CHRDIS" WILL LOOK AT YOUR CHARACTER IN BLOCKS ONE PIXEL HIGH BY EIGHT PIXELS WIDE, WITH EACH PIXEL BEING EITHER "OFF" (BC) OR "ON" (FC). YOU MUST FIGURE OUT THE VALUE OF EACH BLOCK BY TOTTALLING THE "PIXEL VALUES"

128	64	32	16	8	4	2	1
-----	----	----	----	---	---	---	---

FIG. 1

(REFER TO FIG.1). IF A PIXEL IS "ON", IT'S VALUE IS ADDED TO THE TOTAL. FOR EXAMPLE, ALL EIGHT PIXELS "ON" WOULD HAVE A BLOCK VALUE OF 255, ALL "OFF", A VALUE OF ZERO, OR JUST THE FOUR ON THE RIGHT HAND SIDE "ON" WOULD EQUAL 15. (8+4+2+1=15) LET'S CREATE A SMALL GRAPHIC TO ILLUSTRATE.

LOOK AT FIG.#2 TO SEE HOW WE GOT OUR BLOCK VALUES. YOU CAN GO EITHER HIGHER, WIDER, OR BOTH, AND BLOCK VALUES WILL BE READ FROM LEFT TO RIGHT, (IF MORE THAN ONE BLOCK WIDE), AND TOP TO BOTTOM.

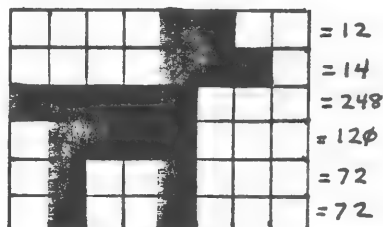


FIG. 2

SO NOW THAT YOU HAVE SOME BLOCK VALUES, WHERE DO THEY GO? WELL, WITHOUT EXTERNAL MEMORY, (E.G. A BLUE RAM, ETC.), YOU HAVE TWO CHOICES. EITHER WE STORE THEM IN THE LINE INPUT BUFFER WITH THE REST OF OUR MACHINE CODE, OR AT THE VERY BOTTOM OF OUR SCREEN. THE FORMER GETS RATHER CROWDED IN A HURRY, THE LATTER CAN GET WIPED OUT BY CLEARING THE SCREEN OR RUNNING GRAPHICS INTO THE BOTTOM. DIRECTLY FOLLOWING THE LINE INPUT BUFFER IS A MEMORY AREA CALLED THE "STACK". THIS IS SORT OF A "PARKING LOT" FOR BASIC TO STORE AND RETRIEVE DATA. SELDOM DOES THIS AREA GET FILLED UP, SO WE CAN GENERALLY RUN A FEW DOZEN BYTES INTO THIS AREA WITHOUT PROBLEMS. THE BEST APPROACH HERE IS TO PUT OUR GRAPHIC INFO IN THE DEEP END, AND OUR MACHINE CODE ROUTINE UP IN THE SAFE END. THIS WAY, IF THE STACK RUNS OVER OUR GRAPHICS, WE GET FUNNY LOOKING CHARACTERS, WHEREAS RUNNING OVER OUR MACHINE CODE ROUTINE WOULD CAUSE OUR PROGRAM TO BOMB.

WHAT WE ARE DOING HERE IS CREATING AN ALTERNATE CHARACTER FONT WITH THE MUTT BEING OUR FIRST AND ONLY CHARACTER. WE START OUR LIST OF CHARACTERS WHERE ASCII CODES END, SO HE WILL BE CHARACTER NUMBER #128. TO USE THIS FONT, WE NOW HAVE A NEW RESPONSIBILITY. WE MUST CONSTRUCT A TABLE IN MACHINE CODE THAT TELLS OUR COMPUTER ALL ABOUT THIS NEW FONT, AND LET IT KNOW WHERE WE HID THIS TABLE. LOAD THE DECIMAL VALUES BELOW WITH THIS DIRECT COMMAND:

```
FOR A=20237 TO 20270:CY=0:PRINT A,;
INPUT " ",X(A):BOX 0,0,160,20,2;
NEXT A
```

DEC	HEX	
% (20237)=221	DD	} LOAD IX WITH ADDR OF OUR ALTERNATE FONT TABLE. (20258)
% (20238)= 33	21	
% (20239)= 34	22	
% (20240)= 79	4F	
% (20241)=213	D5	PUSH DE
% (20242)=255	FF	SYSSUK
% (20243)= 51	33	CHRDIS
% (20244)= 00	00	E (HOR)
% (20245)= 00	00	D (VER)
% (20246)= 40	28	C
% (20247)= 00	00	A (CHAR#)
% (20248)= 00	00	NOP
% (20249)=255	FF	SYSSUK
% (20250)= 51	33	CHRDIS
% (20251)= 00	00	E (HOR)
% (20252)= 00	00	D (VER)
% (20253)= 40	28	C
% (20254)= 00	00	A (CHAR#)
% (20255)= 00	00	NOP
% (20256)=209	D1	POP DE
% (20257)=201	C9	RET
% (20258)=128	80	# OF OUR ALT. CHARACTER
% (20259)= 00	00	UPDATE VALUES
% (20260)= 00	00	(WE DON'T USE 'EM)
% (20261)= 1	01	CHR SIZE WIDTH (X8 PIXELS - 1 BLOCK)
% (20262)= 6	06	CHR SIZE HEIGHT
% (20263)= 41	29	STARTING ADDR. OF
% (20264)= 79	4F	BLOCK VALUES (20265)
% (20265)= 12	0C	} (BLOCK VALUES FOR OUR PUP.)
% (20266)= 14	0E	
% (20267)=248	F8	
% (20268)=120	78	
% (20269)= 72	48	
% (20270)= 72	48	

NOW ENTER THE FOLLOWING BASIC PROGRAM:

```
>10 % (20244)=-9999;V=0;H=0;C=128;% (20247)=C;
% (20254)=C
>20 V=V-JY(1);H=H+JX(1)
>30 IF V<0V=0
>40 IF V>82V=82
>50 IF H<0H=0
>60 IF H>152H=152
>70 % (20251)=V*256+H
>80 CALL20237
>90 % (20244)=% (20251)
>100 GOTO 20
```

ARCADIAN

THE GAME PLAYER

by Michael Prosis

... tries his hand at

EXITOR'S REVENGE
L&M Software, Tape #16

and ...

DUNGEONS OF DRACULA
Wavemakers, Tape #16

EXITOR'S REVENGE

With the assistance of Andy Guevera of Bit Fiddlers, the innovative folks at L&M Software have brought forth what may be the finest sci-fi space invasion game on tape.

EXITOR'S REVENGE, their latest release, is an exciting one-player game of skill that finds you, the player, as guardian of a planet that is about to be attacked by a Battle Star. Your defense is the force field above you, and your offense is the MX missiles that you can fire upwards, steering them with your joystick towards the colorful but awesome warriors of Exitor. Your mission is to destroy the five warriors as they scout out your planet, all the while trying to avoid the photon lasers of the Battle Star. It's not easy, but it is fun!

The machine graphics, smoothness of motion, brilliant colors, continuous sound effects, and 3-D effect all combine to make EXITOR'S REVENGE a cartridge quality game.

As the game unfolds upon your TV screen, you see before you in the foreground, a city, with mountains to the side and behind. In the upper left corner, hovering in space, is an ominous looking Battle Star. Below the city, underground, is a missile launcher which you can move left and right across the width of the playfield by rotating the knob of your joystick. The trigger fires your missile left and right.

Basically the game goes something like this: From the Battle Star is launched a capsule, accompanied by an appropriate sound effect, which moves across and down (in excellent 3-D) to a point just above the city on the right. Here then emerges the first of five warriors, all of which will move back and forth across the screen, each warrior moving faster than the previous one. You must move your launcher into position and fire, directing the projectile at the warrior.

During all this, the Battle Star is firing directly at you, but you are protected by a force field. However, and here's the catch, each hit upon the force field destroys a small part of it. Therefore, if you keep your launcher in one position too long, it will eventually be hit. The player must stay on the move to survive. Three hits on your launcher and you lose. As time goes on, the force field is slowly destroyed, and Exitor's aim becomes more accurate.

EXITOR'S REVENGE is a good game, and those who choose to purchase it will probably be pleased. There is, however, only one minor item that may be a small problem for some players. The projectile launched at the warriors is so tiny it can at times be hard to follow. L&M is aware of this situation, and say they may increase the size of it in the very near future. In addition to EXITOR'S REVENGE, L&M has included one of their old favorites, THE MUMMY'S TREASURE, an interesting treasure hunt type game that has been upgraded to handle up to four players.

Also worth mentioning, is an attractive tape storage album that L&M has made available, that can store up to four tape cassettes. With a nice item like that, plus a fine game such as EXITOR'S REVENGE or their recent release SECRET OF PELUCITAR (a very graphic, excellent Sci-fi maze game), one can be well on their way to many satisfying hours of game playing.

DUNGEONS OF DRACULA

Well, Mike Peace of WAVEMAKERS has done it again: another cartridge quality game that will glue you to your TV screen for hours.

DUNGEONS OF DRACULA is an adventure-strategy type game that pits you against the computer, a computer that in this game takes the form of seven separate monsters who are out to get you.

The game consists of 10 separate and different "mazes", (not mazes in the traditional sense, but large and/or small geometric solids in various designs which you must avoid), through which you must maneuver a chain and try to capture each monster by surrounding him with your chain. At the left is where you, the chain, enter; at the right is where you want to exit, and somewhere in the maze you will see a stationary key which you must first obtain in order to get out that door on the right. However, you cannot have the key until the monster is captured. Once you have the key, the door will open and you exit to the next and naturally more difficult maze, where you face a new monster.

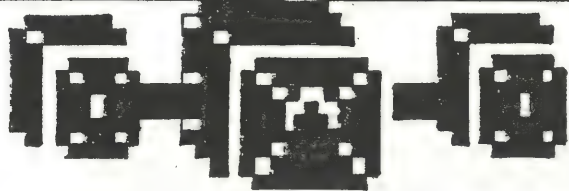
The joystick controls your direction, and squeezing the trigger makes you go faster, (quite fast indeed). Caution must be exercised not to touch anything, or you will disintegrate. Even the key is deadly until the monster is captured. The monsters, by the way, will be floating throughout the playing area, and vary in their aggressiveness from maze to maze. With a time clock ticking away at your playing time, you must waste no time in blocking the monsters' chances for escape and ultimately boxing them in with the chain.

Rich in color and non-stop with sound effects, this player found DUNGEONS OF DRACULA to be both challenging and enjoyable. It will, however, probably require quite a bit of practice for most players in order to reach the more advanced mazes. (CHECKMATE may be a good game to practice with in regards to maneuvering your chain at high speed in close quarters.) And like most of the WAVEMAKER games, this one can also be played by one player or up to four players.

DUNGEONS OF DRACULA ... a good game, a fun game, and at a bargain price, too!

For Bally/Astrocade

EXITORS REVENGE



Smooth Motion



Machine Graphics

You are the commander of the underground MX missile, defense for the top secret facility, which is code named Akreon. This is where our first interstellar star drive is being constructed. You are alerted to the presence of an object coming in from outer space. You immediately recognize it as a battle star of alien origin. You take control of the MX system, positioning the launcher, firing the missiles and guiding them to target, destroying the warriors before they can radio important data to the enemy battle star. LOOKOUT!!! The battle star will fire back.

Exitor smiled to himself as he settled the huge ship into a parking orbit, well above the sprawling complex. It will be easy, he thought, as he armed the triple photon lasers. First release the reconnaissance pods, the warriors survey the area, then destroy the star drive factory.

Exitor yearned for revenge. He and his crew had suffered heavy damage on an earlier earth scouting mission when his ship collided with an earth satellite, causing a gigantic explosion.

Exitor had journeyed several hundred light years to stop the development of a star drive, by which the earth people could travel to distant galaxies. BUT!! he doesn't realize your underground MX system is there.

Can you save Akreon from destruction and in so doing, pave the way for travel to the stars?

Normally, a picture this detailed in 3-dimension would require more memory than is available in the Astrocade program section. We have utilized a special arcade feature called mass screen memory. There is almost 4K of memory available in this way. The game operation is contained in the 1.8K program memory section, while the machine graphic utilize specially encoded memory sections. By using all three in a unique way this game, with expanded graphics and smooth flowing motion, is possible. It is equivalent to about 6K of memory.

A special note of thanks to Andy Guevera of Bit Fiddlers, without whose help this game could not have been.

Tape Cassette # 16

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An enhanced version of the popular Othello,
this takes advantage of some of the effects
available only in the Extended Basic language.

```

1 10-JELLO
3 BY CLYDE PERKINS
5 JAN., '82
10 GOTO 440
60 GOSUB 180:E=5:F=4:GOSUB 120:GOSUB 410
70 BOX E,F,7,6,1:G=E:H=F:E=E+JX(P)*10:F=F+JY(P)*9:FOR Z=0TO 99:NEXT Z:BOX G,H,7,6,1:IF TR(P)=0
GOTO 70
80 X=(G+90)+10*10-85:Y=(H+90)+9*9-85:IF (ABS(X)>35)+(ABS(Y)>32)GOTO 140
90 IF PX(X+3,Y)GOTO 110
100 S=-10:GOSUB 210:IF Q P=(P=1)+1:GOSUB 180:GOTO 150-90*(I#0)
110 GOSUB 130:PRINT "OOPS",:FOR N=0TO 1000:NEXT N:GOSUB 120:GOTO 70
120 GOSUB 130:BOX CX+9,CY,27,9,4:RETURN
130 CX=120*P-189:CY=0:NT=3:RETURN
140 GOSUB 130:PRINT "PASS",:GOSUB 170:P=2-(P#1):IF (P=1)+(I#0)GOTO 60
150 P=2:GOSUB 410:GOSUB 200:P=2:IF U#0X=C:Y=D:S=-10:GOSUB 210:P=1:GOTO 420
160 GOTO 140
170 IF PX(-69,0)=PX(51,0)GOTO 190
180 IF @(<0)+@(<1)#64RETURN
190 BOX 0,0,59,17,6:CX=-23:CY=0:PRINT "GAME OVER",:K=KP:RUN
200 P=0:U=0:FOR Y=32TO -31STEP -9:S=0:FOR X=-35TO 35STEP 10:M=10:IF PX(X+3,Y)M=-10:GOTO 240
210 Q=0:FOR U=X+5TO X+10STEP 10:FOR W=Y-9TO Y+9STEP 9:IF PX(U+3,W)IF PX(U,W)=(P=1)*3GOTO 250
220 NEXT W:NEXT U:IF PRETURN
230 IF Q A=X:B=Y:GOSUB 390:Q=Q+R:IF U<Q U=Q+RND (9)-7:C=X:D=Y
240 S=M:NEXT X:NEXT Y:RETURN
250 Z=0:IF U<XGOTO 270
260 IF M>U-X M=U-X-10
270 GOSUB 400:MU=RND (26)+64:A=X:B=Y:FOR L=1TO 8:A=A+U-X:B=B+W-Y:IF PX(A+3,B)=0GOSUB 400:GOTO 2
280 IF PX(A,B)=3b(P#1)GOTO 320
290 IF P=0GOSUB 390:Z=Z+R:NEXT L
300 IF ZGOSUB 360
310 NEXT L
320 IF P=0Q=Q+Z+99*(Q=0):GOSUB 400:GOTO 220
330 IF ZGOTO 220
340 IF Q=0A=X:B=Y:GOSUB 370
350 Z=1:Q=1:GOTO 270
360 T=2-P:N=-1:BOX A,B-1,7,6,4:GOSUB 380
370 T=P-1:N=1:FOR E=3TO 7STEP 2:BOX A,B-1,E,9-E,3:NEXT E:BOX A,B-1,2*P+1,2*P,3*P+1:NT=3:MU=90-P
380 CX=120*T-63:CY=20:@(T)=@(T)+N:NT=0:PRINT #2,@(T),:RETURN
390 O=ABS(B)*9b4+ABS(A)*10+2+32*(B<0)+16*(A<0):R=@(<0):RETURN
400 BOX X,Y-1,9,8,(P=0)*2:RETURN
410 BOX 0,-40,160,7,4:GOSUB 120:CY=-40:PRINT " ^",:RETURN
420 GOSUB 180:FOR B=-31TO 32STEP 63:FOR A=-35TO 35STEP 70:IF PX(A,B)GOSUB 390:@(<0-5)=0
430 NEXT A:NEXT B:GOTO 60
440 CLEAR :INPUT "HOW MANY PLAYERS ?"I:I=I-1:IF I>1GOTO 440
450 CLEAR :FOR N=-4TO 4:BOX NX*10,0,1,73,7:BOX 0,N*9,81,1,7:NEXT N:@(<0)=-1:@(<1)=-1
460 FOR P=1TO 2:A=120*P-181:B=10:GOSUB 370:FOR B=-4TO 5STEP 9:A=(P*2-3)*B+ABS(B)*5:GOSUB 370:NE
XT B:NEXT P:IF I P=1:GOTO 60
470 @(<2)=3:@(<3)=5:@(<4)=1:@(<5)=8:@(<7)=9:@(<8)=0:@(<9)=15:@(<12)=-15:@(<13)=2:@(<17)=99
480 FOR X=0TO 3:FOR Y=0TO X:FOR Z=2TO 50STEP 16:FOR W=1TO 4STEP 3
490 @(<X+W+Y*(5-W)+Z)=@(<X+W*4+2):NEXT W:NEXT Z:NEXT Y:NEXT X:P=1
500 GOTO 60

```

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Treasure Island/Fox & Hounds

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1. All the excitement of the old time oil wildcatters! Take charge of your small company as you explore for oil. Study the geological data, calculate the risks, and make the smart investment. You could become a wildcat millionaire! Computer gives all necessary data for one to four players. Holds production and income information for up to ten wells per player. Keeps the running account of income and expenses right down to the dollar. Full graphics and sound.
2. A bomb has been discovered at police headquarters. In order to disarm it you will need: the eye of an eagle, the steady hand of a brain surgeon, the deductive powers of Sherlock Holmes, and the heart of a Kamikaze pilot. Oh yes, you will also need BADCOR (Bomb Analysing Disposable Computerized Robot). Can you diffuse the bomb before it blows you up?

The Great American Jigsaw/Big City Slick

\$15.95

1. Everybody knows where California, Texas and Florida are located, but can you identify the state which the computer has selected at random and drawn in the lower left hand corner of the map? It is surely easy with seven choices from which to pick, but if you really need help the computer will assist you by showing its exact location. 10 pts for the geographer and 5 pts. for the duffer. We give you the three easy states and the other 45 go together like a jigsaw puzzle.
2. Side 2 gives you topographic features and asks for major cities. Red, White, and Blue graphics for a patriotic effect.

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1. GARF is attacking Garbersville! You are the only hope for defense of its good citizens. Will your missiles intercept his bombs in time to save this strategic outpost?
2. Tenpins - an exciting game of bowling complete with hook ball, gutter balls, AMF style pinsetter and every spare situation found in real bowling.

Starship Command/Mini Golf

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1. You are sitting at the helm of the 400,000 metric ton starship looking through the front viewing screen into deep space. It is a weary ship. You have already destroyed a Klingon outpost and have just done battle with a Class 1 Cruiser. Suddenly a siren sounds "Red Alert". "Klingon Battle Cruiser" flashes across the sensor read out and suddenly the vessel appears on the screen, very small at first, but getting bigger as he approaches. He's attacking at warp factor 6! Before you react the enemy fires! An alarm sounds! Engineering reports the hit damaged the photon torpedoes. The forward shield is still weakened from the last battle. Another blast fills the screen as its about to hit. You must act quickly! You are not yet in phaser range. What will you do???

Road Toad

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- The old proverbial chicken may have crossed the road to get to the other side but the road toad has slightly different motives. In the tradition of Angels Camp you will prod the toad with the use of your joystick skillfully guiding him through several lanes of traffic that becomes increasingly congested. But watch out for the speed demon in lane 3. He often comes without warning and definitely does not break for toads. (In Smooth Action Machine Language Graphics)

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- "They called him Super Skier though he'd never had a lesson..." And now you take up where he left off. Super Slope is a super skiing program from Esoterica. No experience is necessary. Great Fun! (In Smooth Action Machine Language Graphics)

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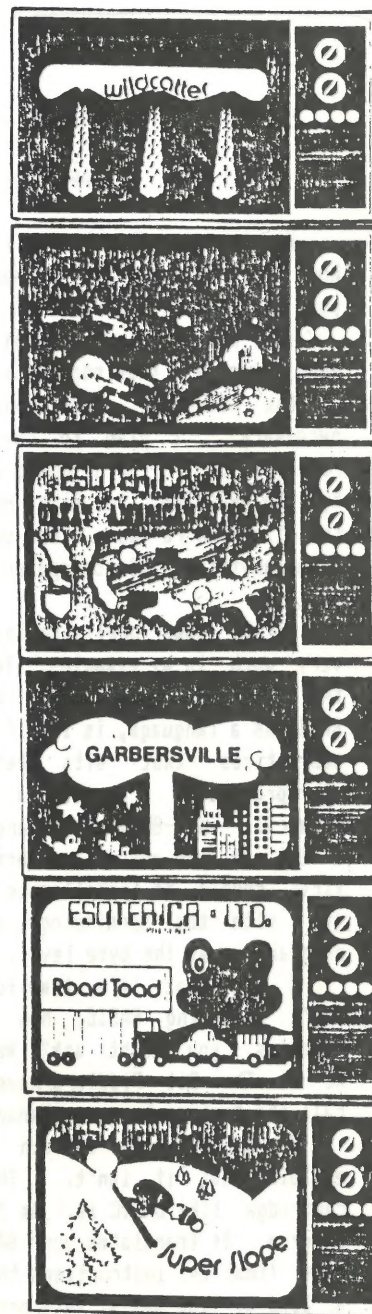
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ARCADIAN

THE BIT FIDDLER'S CORNER

BY

ANDY GUEVARA

Hi there! This is the first installment of what I hope will be a long and prosperous relationship between you, me, and the ARCADIAN.

The aim of this column is simple--to dispense as much "inside" knowledge as possible about the workings of the Astrocade. This means down to the bit level if necessary. I plan to cover a lot of the material referred to in the on-board subroutines manual put out by the ARCADIAN. You might want to pick up a copy. By the time we're done, we ought to be able to do just about anything a microcomputer is supposed to be able to do.

First, some preliminaries: I won't be using BASIC very much in my examples. The reason for this is that the Astrocade innards are not programmed in BASIC. BASIC as a language, is itself a program and a series of subroutines that sits between us and the Z-80 microprocessor. So, as a rule, I will be talking primarily in Z-80 machine language. I know there's not a lot of you who will understand it right off, so the first couple of installments are set up to familiarize you with the terminology and conventions used in programming at the byte level.

I see that it's time for a sales pitch...Since I won't be using BASIC, how am I going to try out examples, you might ask? Well, the answer is simple. We at The Bit Fiddlers have developed a cartridge we call the Machine Language Manager.

So as to help explain what it is, let me first explain what it isn't. The MLM is not a language cartridge like BASIC is. As I said earlier, BASIC is a program. It translates your BASIC statements to machine code (that is, instructions the Z-80 can understand) on a line-by-line basis, interpreting each statement as it goes. This is why there are line numbers; so the interpreting process doesn't get lost. This also explains why BASIC programs are relatively slow.

The MLM, not being a language, doesn't need line numbers. It works directly on the Z-80 memory. It's what is known in the trade as a Monitor program. Its purpose is to directly enter and change values or instructions the Z-80 will understand. This way you get to tell the Z-80 precisely what to do.

What this means is, in order for you to use the MLM, you're going to have to learn to use Z-80 machine language. But then, that's why this column is here...to show how the Astrocade works--in machine language.

A little more on the MLM. We've put in a few helpful capabilities, such as a formatted listing, ability to change the register contents, cassette tape storage routines for use with the original 300 Baud

interface, and a print routine for those of you who have connected a printer to your unit. There are also routines in the cartridge to clear the screen, change the amount of memory available for your programs, and output single characters or whole lines to the screen or printer.

So these are the advantages:

1. You get faster-running programs
2. Programs take up less space than their BASIC equivalents
3. Memory can be rearranged to allow over 3K Bytes of storage
4. You get 4 colors for either side of the Right/Left boundary instead of 2
5. You get direct access to the on-board subroutines for animation, character generation, graphic effects, timing, and sound effects.

In other words, you have the capability to produce cartridge-quality programs that are storeable on cassette tape! Trust me.

But back to what I set out to do.

The Z-80 talks in, and responds to Bytes. Fine, what's a Byte? Well, a Byte is made up of 8 Bits. Bit is short for Binary Digit. So the Z-80 talks in Binary.

Think of it this way: At the Z-80 data port there are 8 ON-OFF switches lined up side by side. There are only two states each switch can be in: ON or OFF. This is how Binary (Base 2) arithmetic works.

To give the Z-80 a particular instruction code, we can set the switches to a particular combination of ON and OFF states. Let's assign the number 1 to the ON state and 0 to the OFF state. Now we can do it in terms of a binary code, such as 01100110.

Well, there's a better way yet. We can translate this binary number into one we can better understand. For example, 00000001=1 Base 10. Simple enough. Let's drop the leading zeros for now. OK, let's add 1+1 in Base 2: 1+1=? Since values can only be 1's and 0's, we have to put a 0 and carry a one into the next column. The answer then is 10 in Binary, 2 in Base 10.

Well what's all this mean? It means we don't have to keep track of Z-80 instructions in configurations of 8 individual bits. We can do it by converting to numbers.

Binary goes like this:

0000	0
1	1
10	2
11	3
100	4
101	5
110	6
111	7
1000	8

ARCADIAN

and so on, to 255 for all 8 bits being turned ON. But this is a little unwieldy if we have to go back and forth to the Binary form. So let's try a different approach.

Break the 8 bit configuration into two 4-bit subcodes, like 0110 0110. Now each subcode, called a Nibble (honest!), can be a number from 0 to 15. Let's further constrain it by saying each nibble can only have a 1-digit representation. That would make 0110 0110=66 in the new code.

But what about the numbers 10 to 15? Well, since we can't have 2-digit nibbles, we'll assign the letters A through F for these values. Welcome to the Hexadecimal world!

In this system, each four bits represents one Hexadecimal column. That is: F+1=10 in Base 16. It equals 16 in Base 10.

The reason for all of this is that almost every book ever written for the Z-80, or any other microprocessor, leans heavily on Hex numbers. At 2 digits per byte you can see why, in terms of printer's ink alone!

OK, we know that Z-80 instructions are coded in Bytes made up of 2 Hex digits. But how do we get the codes into memory? And where do we put them? How does the Z-80 know where to go to get at them? Answers to these and other burning questions will be in next month's column.

One last thing. I'd like to hear from you and what you think about the column. Is it at too low a level or too high? Also, are there any requests? Do you have a particular problem or application that you would like addressed? Drop me a line!

The format of the column is still flexible and YOU are the ones to benefit. See you next time.

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PRINTING WITH THE ASTROBASIC CARTRIDGE is now possible - if you have the old Cassette Interface modified for the printer output. In the old Bally Basic Videocade, the command *PRINT was used to pass data out through hand controller port 3. The old cassette interface was then home-modified to tap off the proper signals that would operate a serial printer. The following scheme by Al Rathmell directs the new Astro Basic to perform the same function. Remember, you must have the modified cassette interface to utilize this.

Al Rathmell writes: "A small machine language routine (45 words) is loaded from tape, in a few seconds, to a normally unused portion of RAM memory (bottom of stack area). Two simple instructions enable or disable the PRINT function.

"In order to make the routine as small as possible, the conversion of tokens (WORDS commands) to the appropriate character string is accomplished by CALLS to the Basic ROM routines.

"The note time (NT=X) can be used to slow down the average print rate just as with Bally Basic.

"To load the print routine the first time, use the direct Basic statement:

```
FOR A= 20258 TO 20344 STEP 2; PRINT A.; INPUT
%(A); NEXT A
```

"Press GO and the computer will put the first value of A on the screen. Now enter the first value of the following column of entries and press GO. The computer will then ask for the second input - and so forth. The entries are:

-9739	15882	-13367
10957	15808	6153
-3761	-736	224
-13863	10245	-12934
30974	-9448	11539
1072	24338	-12855
26878	4827	12074
13104	-6485	-6530
22272	10242	-6785
-13494	31737	13005
-9471	-6487	-7857
-6638	10242	9086
10242	-9470	12295
1786	-13550	16115
		-15584
		20274

"To save the print routine on tape for future use, type the following :PRINT %(20258),45

"Start the recorder in its RECORD mode, and press GO on the Arcade. The routine will load on the tape in a very short time. It would be a good idea to place it at the beginning of a tape, to be followed by the program of interest.

"For future use of the routine, load it into the computer from the tape with the following command :INPUT %(20258)

"Start the recorder in PLAY, and then press GO on the Arcade.

"Two instructions are used to enable or disable the function -

1 To Enable (the equivalent of *PRINT)

%(20124) = 20258

2 To Disable (the equivalent of :RETURN)

%(20124) = 11531

"These instructions may be used in a direct Basic statement. For example, to print the entire Basic program you may have in the Arcade, and then to disable the function, use

%(20124)=20258;LIST;%(20124)=11531

This is the same as the Bally Basic's statement

*PRINT:LIST::RETURN

There is a possibility of our producing a small gadget which would be the equivalent of the old cassette interface box, but with only the insides necessary to perform the output function in conjunction with the above routine. If you are interested in joining in on such a project - a device that may cost - say \$20 - let me know RF

FOR SALE Bally computer system like new. 2 controllers, AstroBasic, FBall, SFortress. GPrix, 280 Zap, GInvasion, ABattle, Incr. Wizard, EIMath, Various games on cassettes. Vol 4 of ARCADIAN \$425. Steve Roach, 1016 Mockingbird Dr., Grapevine, TX 76051 817-488-9434

R&D Enterprises reports that they are no longer providing any software, and the post office will return any mail addressed to R&D.

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44

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